HOW PLASTICS POISON THE CIRCULAR ECONOMY

DATA FROM CHINA, INDONESIA AND RUSSIA AND OTHERS REVEAL THE DANGERS



Executive Summary

February 2022

IPEN

for a toxics-free future

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IPEN is a network of over 600 non-governmental organizations working in more than 120 countries to reduce and eliminate the harm to human health and the environment from toxic chemicals. IPEN's campaign on Toxic Chemicals in Plastics seeks to eliminate harm from chemicals in plastics when plastics are produced, used, recycled, and discarded.

ipen.org

Arnika is a Czech non-governmental organisation established in 2001. Its mission is to protect nature and a healthy environment for future generations both at home and abroad.

arnika.org/en

Nexus3 or Nexus for Health, Environment, and Development (formerly known as BaliFokus Foundation) is an organization in Indonesia that works to safeguard the public, especially vulnerable populations, from the impact of development to health and the environment, towards a just, toxics-free, and sustainable future.

www.nexus3foundation.org

Toxics Free Corps/Shenzhen Zero Waste focuses on independent testing and corporate advocacy to provide detoxification of public, daily consumer goods, as well as mainstreaming chemical management issues by fostering and developing civil corporation networks, all to achive a "non-toxic national" vision.

www.toxicsfree.org.cn

Eco-Accord Center for Environment and Sustainable Development promotes the transition to sustainable development by searching and implementing new approaches to solving environmental, economic and social problems at the global, national and local levels, as well as educating the general public about environmental protection and sustainable development.

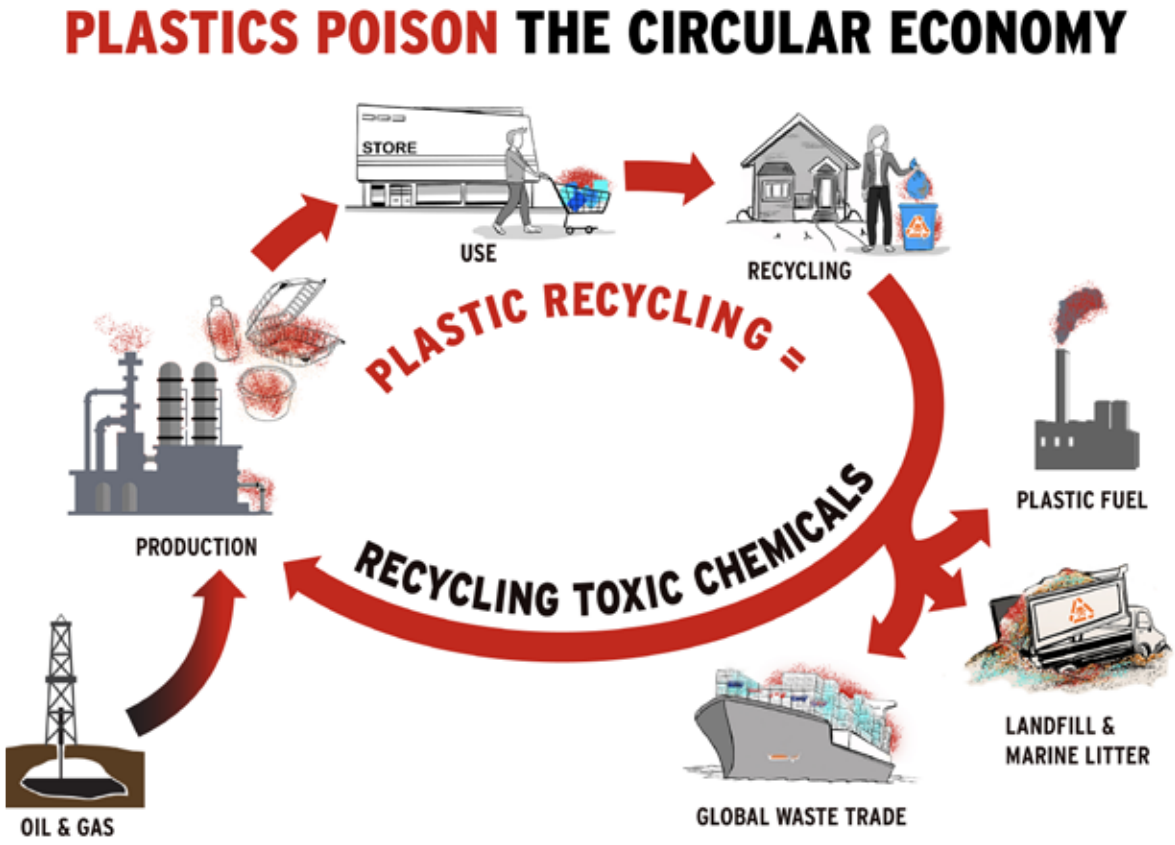
www.ecoaccord.org

Front cover: (back) **thermal station Moscow, Russia;** (inset, left to right) **toy store in Shenzhen, China; toddler biting a teething toy; worker carrying bundled plastics at recycling center in Moscow, Russia; mother feeding child from bottle** (Nathan Dumlao/ Unsplash). **Opposite: Woman working at "modern plastic industry" recycler, Java, Indonesia.**

KEY POINTS

IPEN has carried out a number of studies that highlight:

- Huge volumes of diverse plastics waste streams, coupled with a lack of information on hazardous ingredients in plastic products, create a significant, unmanageable obstacle to countries seeking to implement circular economies.
- Toxic chemicals, that have been banned under international chemicals conventions, are being recycled from plastic waste into new consumer products, resulting in risks that are impossible to quantify because of lack of knowledge on material composition.
- Toxic chemicals continue to be used in consumer products in the countries assessed, despite being identified as harmful and restricted, or banned in other regions, further fueling the supply of non-circular hazardous plastic waste globally.
- As plastic production and use escalates, China, Russia, and Indonesia — all major economies — will continue to be unable to handle large volumes of plastics waste safely, while blindly allowing known toxic chemicals into the market in plastic products, without regulations that require plastic ingredients to be labelled.
- A dialogue on the health and environmental impacts of the plastics circular economy is essential, and plastics producers should be financially liable for any harm caused through the life cycle of plastics.



IPEN NETWORK INVESTIGATES THE PLASTIC CIRCULAR ECONOMY IN MAJOR ECONOMIC MARKETS

To better understand the risks associated with plastics and the circular economy, IPEN investigated the situation in three significant global economies – China, Indonesia, and Russia. It analyzed:

- The volume of plastic production, import, and use;
- The status of waste management and recycling, and their governance systems.

It also carried out three studies on the presence of toxic chemicals in plastic and synthetic textile consumer products. (The chemicals are present as a result of recycling products that already contain toxic additives, or are added intentionally to impart functionality, such as stain or water resistance.) The studies looked at:

- Brominated flame retardants (BFRs) in recycled plastic products from China, Indonesia, and Russia;
- Perfluoroalkyl and polyfluoroalkyl substances (PFAS), known as 'forever chemicals', in clothing in China, Indonesia, and Russia;
- The presence of bisphenol A (BPA) in baby bottles in Bangladesh, Bhutan, China, Indonesia, Malaysia, Russia, Sri Lanka, and Tanzania.

WHAT THE STUDIES REVEAL

Overall, the studies' findings paint a nightmare scenario of countries unable to deal with complex hazardous waste streams and citizens exposed to toxic chemicals in everyday products. The results, in combination with previous IPEN studies, indicate that many plastics pose serious risks to people and the planet throughout their life cycle (production, use, recycling, and disposal).

The work highlights the extent of the problem today, which is already causing major concerns in terms of the planet's capacity to manage the risk burden of plastics[1]. With plastics producers predicting a five-fold increase in output between 2020-2050, the complexity of the situation needs to be understood and urgently addressed.

Core to the problem are:

- The dramatic increase of plastic production and consumption (for example, over five years, a 64% increase in Russia and 25% in China);
- The widespread use of toxic chemical additives in plastics;
- The lack of regulatory frameworks in many countries to manage health and environmental risks of plastics and chemicals;
- The generation of large volumes of plastics waste, much of which is entering the environment.
- Insufficient infrastructure in many countries to collect waste and recycle or treat it in a way that avoids further threats to human health and the environment.
- Lack of knowledge and control relating to the circulation of toxic chemicals in waste and recycled products.

A GLOBAL INSTRUMENT TO TACKLE PLASTICS NEEDS TO ADDRESS MULTIPLE ISSUES

IPEN believes the situation needs an urgent international response. Between 28 February-2 March 2022, over 190 governments will meet at the UN Environment Assembly (UNEA) to discuss the introduction of a global instrument to tackle marine waste and plastic pollution.

IPEN wants to see an agreement that is based on a comprehensive approach to prevent and reduce plastic pollution in the environment, including microplastics. IPEN backs the approach proposed by Rwanda and Peru, supported by over 50 countries, that this should be achieved by reducing the overall amount of plastic production and addressing the full life cycle of plastics from production, consumption and design, to waste prevention, management and treatment, including provisions to control compounds, additives and harmful substances, as well as intentionally added microplastics.

IPEN IS CALLING FOR:

The strengthening of global policies to simplify the range and reduce the volume of plastic materials in commerce, focusing on essential uses, the elimination of toxic chemicals in new plastics, and the labelling of ingredients;

Ending Hazardous Plastic Waste Management through policies that protect human health and the environment, including banning toxics recycling, the use of plastic waste as fuel, and incineration as a disposal method; and

Holding plastic and chemical producers financially responsible for the social, economic, and environmental harm caused by their products through taxes, fees, and deposit return programs.

1 Operating outside the planetary boundary for novel entities https://pubs.acs.org/doi/10.1021/acs.est.1c04158#:~:text=The%20novel%20entities%20boundary%20in,integrity%20of%20Earth%20system%20processes.

Child's toy among computer circuit boards at recycling center in Guiyu, Guangdong, China. (Reuters/Alamy.com)

A DEEPER DIVE INTO IPEN'S STUDIES

THE CURRENT STATUS OF PLASTICS WASTE MANAGEMENT IN CHINA, INDONESIA AND RUSSIA

To shed light on the situation for plastics and their waste management in China, Indonesia and Russia, IPEN's local partners conducted three country studies, funded by the Swedish government. Even though all three countries have significant economies, information on their capacity to manage waste has been lacking. Each study assessed the countries' policies and regulations relating to waste, and the supply and demand of their petrochemical and plastics industries, including the plastic waste trade. The burden of plastic waste on the public and environment in each of the countries was assessed, and IPEN has made specific recommendations for each country.

Taken together, the studies indicate many problems in all three countries, even when governments have introduced policies to tackle waste plastics. These issues are likely to be replicated around the globe.

CALL-OUTS FROM THE STUDIES

A report by the Vanke Foundation found that, when it comes to recycled plastic products, there are still many people in China who think of the plastic recycling industry as consisting of many small, ill-regulated companies which cause severe pollution.

The Indonesian National Plastic Action Partnership 'business as usual' projection estimates that plastic pollution will increase by a third to 6.1m tonnes in 2025 and will more than double in 2040 – even if plastic waste collection rates keep pace with growing waste generation.

In Russia, recycled plastic products include toys for children. Such plastics may contain flame retardants that are normally found in the plastic enclosures of electronic products.

As well as assessing the countries' capacity to manage plastic waste, IPEN also used its network to investigate the presence of toxic chemical additives in consumer products in three separate studies, which are described below.

BROMINATED FLAME RETARDANTS IN (RECYCLED PLASTIC) PRODUCTS FROM CHINA, INDONESIA AND RUSSIA

The study looked at brominated flame retardants (BFRs) in recycled plastic products from China, Indonesia, and Russia to determine whether certain products (toys, hair accessories, office supplies, and kitchen utensils) contained BFRs. While looking to corroborate previous studies regarding the use of recycled, flame-retardant-containing plastics, the study also aimed to contribute to the setting of standards and to improve the control of harmful BFRs in plastic consumer products and waste.

RESULTS

All 73 samples analyzed contained BFRs banned by the Stockholm Convention (POP-BFRs, i.e., penta- octa-, decaBDE, and HBCD). All samples contained octaBDE (at concentrations ranging from 0.008 to 261.7 ppm) and 72 samples contained decaBDE (at concentrations ranging from 0.088 to 442.6 ppm).

The varied composition and concentrations of BFRs in the samples suggests that plastic waste from heterogeneous sources was used to produce the recycled plastics likely to have been used to make these products.

None of the countries have legislation banning the use of all POP-BFRs, yet all produce and receive e-waste containing these substances. The presence of BFRs in consumer products is highly undesirable, as the chemicals pose significant risk to human health and the environment[2].

Recycling exemptions to the global ban of penta- and octaBDEs, and low threshold limits for POPs in waste set in the Stockholm and Basel Conventions, allow POP-BFR recycling into new products, and export of end-of-life products and waste with POP-BFRs into developing countries. A limit of 50ppm for the sum of PBDEs should apply to bring standards into line with PCBs already listed by the Stockholm Convention and to stop toxic recycling and waste exports into countries lacking capacities to deal with the waste. Based on a 50ppm limit, 62 out of 73 (85 %) would be categorized as POPs waste.

BASED ON THE FINDINGS, IPEN RECOMMENDS:

- ***To achieve a non-toxic circular economy and avoid regrettable substitution***, a class-based approach for restricting all brominated flame retardants needs to be implemented.
- ***To ensure PBDE- and HBCD-treated products are separated from recycling streams,*** health and environment-protective limits need to be set for POPs wastes under the Basel Convention. This should be 50 ppm for the sum of polybrominated diphenyl ethers (PBDEs: i.e.m penta-, octa-, decaBDE) and 100 ppm for hexabromocyclododecane (HBCD) in waste. Waste streams above these levels must be managed in an environmentally sound manner in line with the Basel and Stockholm Conventions.
- Until products are made without toxic additives, environmentally sound separation needs to be deployed, to remove ***wastes contaminated with toxic chemicals*** from other plastics prior to recycling.
- ***To prevent the export of e-waste to countries that lack regulatory infrastructure and technical and economic capacities for hazardous waste management***, the export of e-wastes must be banned by the Basel Convention. E-waste must be clearly defined as hazardous.

2 Seven harmful chemical types in plastics https://ipen.org/documents/7-harmful-chemical-types-plastics

PFAS IN CLOTHING IN CHINA, INDONESIA, AND RUSSIA

PFAS chemicals have been used extensively to make outdoor clothing waterproof. Concern about the health and environmental impacts of PFASs have led to an international ban on specific chemicals. However, there are around 4,700 PFAS chemicals - and many manufacturers have switched from those banned to others that are yet to be regulated. From a circular economy perspective, the presence of PFAS chemicals in consumer products causes exposure during production and disposal. At present few textiles are recycled, but the use of PFASs hinders recycling as it will result in people being exposed via new products. The IPEN study set out to assess the use of PFASs in synthetic outdoor clothing and sportswear products in China, Indonesia and Russia and aims to contribute to the discussion on how to achieve a non-toxic circular economy.

RESULTS

84% of the samples tested contained at least one of targeted PFAS substances - however, of the 55 PFAS substances tested, only four were found. These were three fluorotelomer alcohols (FTOHs) and one polyfluoroalkyl phosphate diester (di-PAP). FTOHs and their breakdown products, which include globally banned PFOA, are associated with human health effects. The limited number of PFAS substances identified in the study is consistent with previous investigations and highlights the limitations of analytical test methods. Most textile waste currently goes to landfill, or incineration (which is likely to lead to emissions of PFAS and fluorinated greenhouse gases, among other pollutants). However, the studies show that growing demand to recycle textiles will be problematic. PFASs are hard to trace and difficult to remove from fibers. Recycling PFAS-treated textiles will lead to uncontrolled exposure to 'forever chemicals'.

BASED ON THE PFAS FINDINGS, IPEN RECOMMENDS:

- National governments should implement the Stockholm Convention's listing of PFOS and PFOA by implementing national legislation banning the substances, and develop and implement broad restrictions on PFASs.
- Parties to the Stockholm Convention should remove all exemptions and acceptable purposes of PFOS and PFOA, support the listing of PFHxS without exemptions, and work for a class-based approach so that all PFASs are listed for elimination under the convention.
- Parties to the Basel Convention should define all PFAS-contaminated waste as hazardous, based on delayed or chronic toxicity and they should ratify the Basel Ban amendment prohibiting trade of PFAS-contaminated waste to non-OECD countries. They also need to acknowledge that PFAS-contaminated products are non-recyclable, and need to be recognized as such in technical guidelines on the environmentally sound management of plastics waste. A class-based approach to determining maximum limits for PFAS in waste should be taken.
- Stakeholders in the Strategic Approach to International Chemicals Management should significantly increase their efforts to support the transition to safe, non-PFAS alternatives or phase out non-essential uses. Information, including hazard data for PFAS and alternatives, and analytical methods need to be made available. And the public needs access to better information so that they can choose PFAS-free products.

A CALL TO ACTION: FREE CHILDREN FROM BPA'S LEGACY

A number of countries, including EU member states, Malaysia, China, and Indonesia have restricted the use of BPA in baby bottles. However, many countries do not monitor compliance well. To address this problem, IPEN used its network of participating organizations to collect baby bottles in eight countries for assessment of the BPA content. The countries included: Bangladesh, Bhutan, China, Indonesia, Malaysia, Russia, Sri Lanka, and Tanzania.

RESULTS

BPA was present in 78% of the 98 products tested. As BPA is an endocrine-disrupting chemical there is no safe exposure limit, and the fact this chemical is found in food contact products designed for children, who are particularly vulnerable to EDCs as they grow and develop, is extremely concerning. Note that 61% of samples labelled BPA-free was found to be mislabeled. One of these mislabeled samples also violated Malaysia's Food Regulations, as use and import of polycarbonate baby bottles with BPA is prohibited in that country. All other samples are technically legal to sell in their markets.

BASED ON THE BPA FINDINGS, IPEN RECOMMENDS:

An immediate ban on BPA and bisphenol-based materials, prioritizing children's products and food contact materials, and including legally binding rules for use of "BPA-free" in consumer labeling.

Support for substitutions with safe alternatives to BPA and bisphenol-based materials.

Establishing mechanisms to monitor product compliance.

A requirement for bisphenol-based materials to be removed from waste streams to prevent these chemicals being recycled into new products.

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